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## (54) Lift assembly for parking cars

(57) A lift assembly for parking cars includes a movable parking platform 21, a power operated hoisting chain 31 a contact switch device (4, 5, Fig 2, not shown) and an anti-descent unit 6. If the chain unit should accidentally break, the contact switch device (4, 5) causes a gripping rod of the anti-descent unit 6 to be extended into one of the positioning-holes P1 of a positioning member P so as to stop downward movement of the movable parking platform 21. The rod is moved by a solenoid and spring.

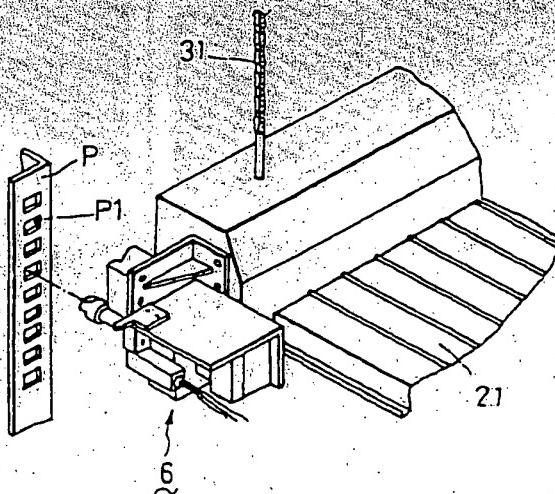


FIG.5

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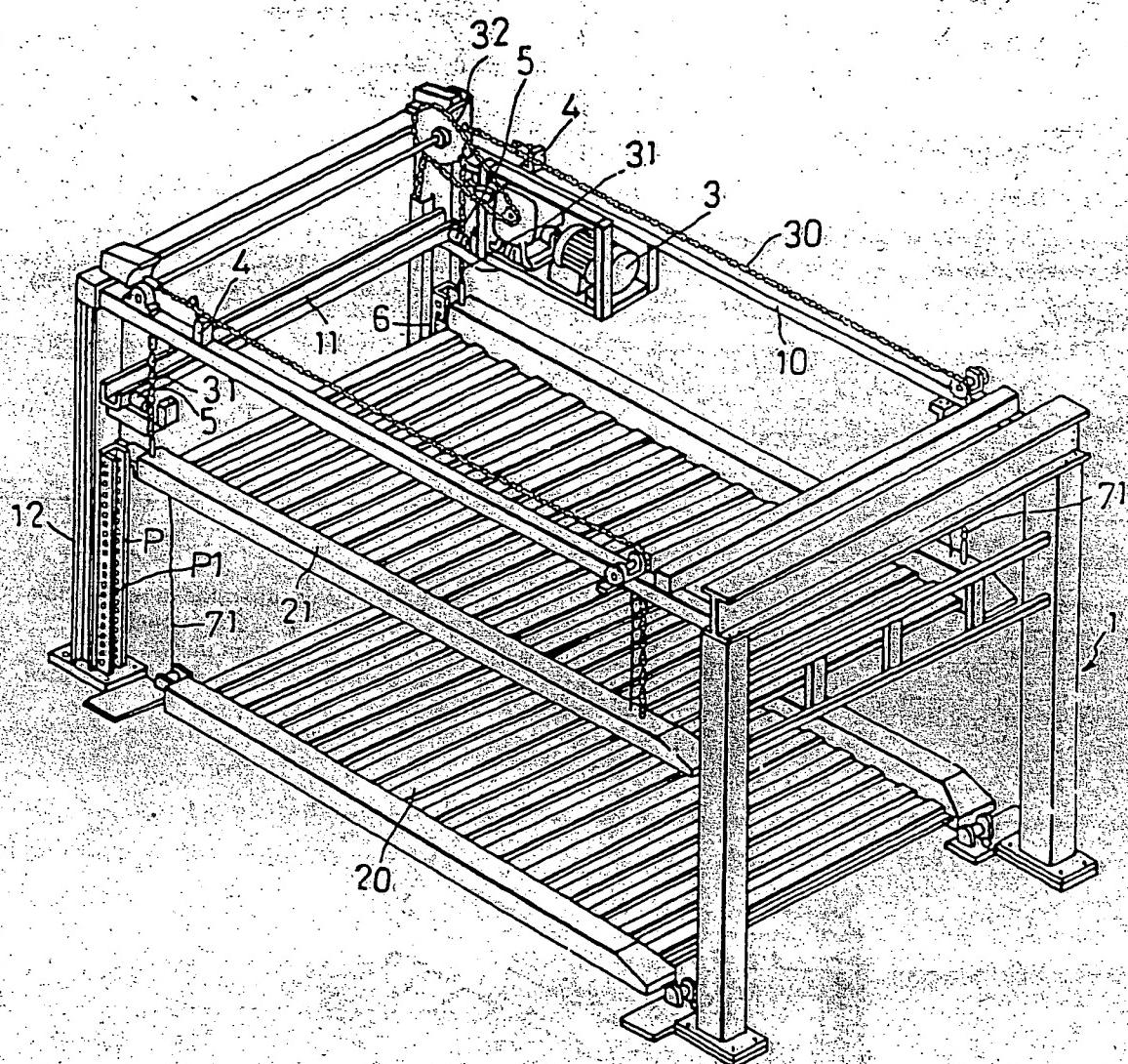


FIG.1

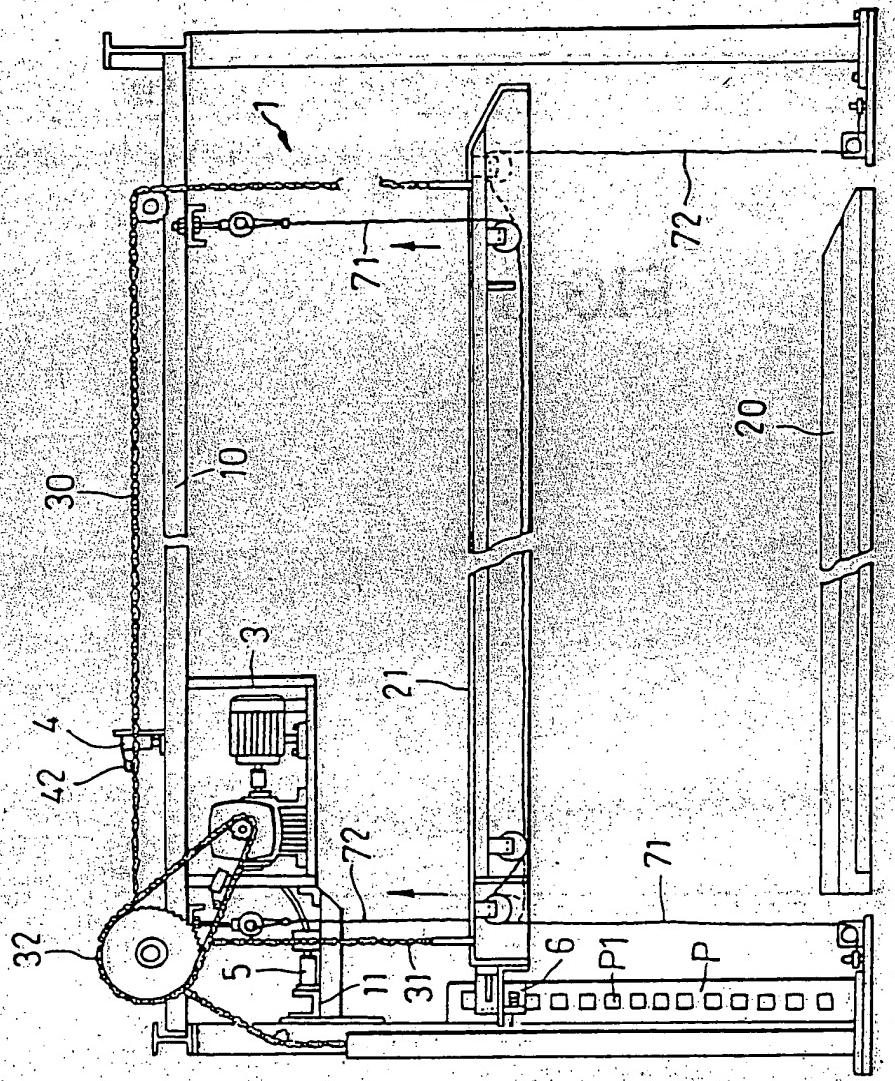


FIG. 2

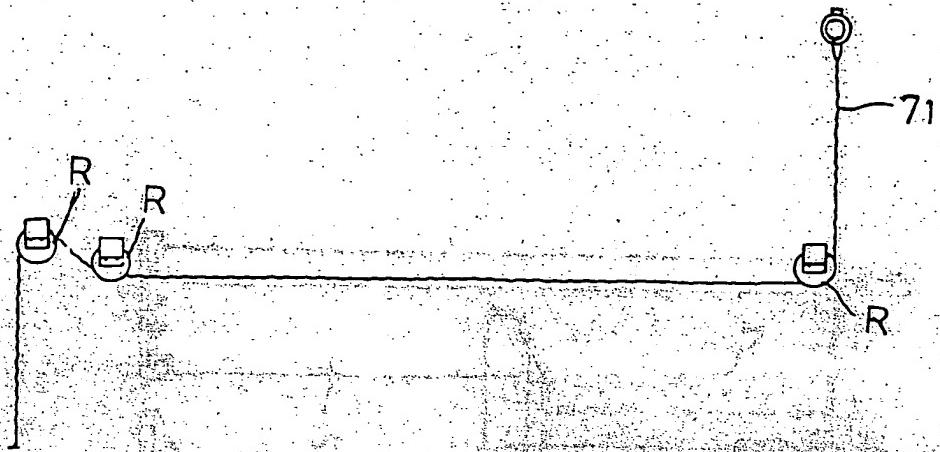


FIG. 3



FIG. 4

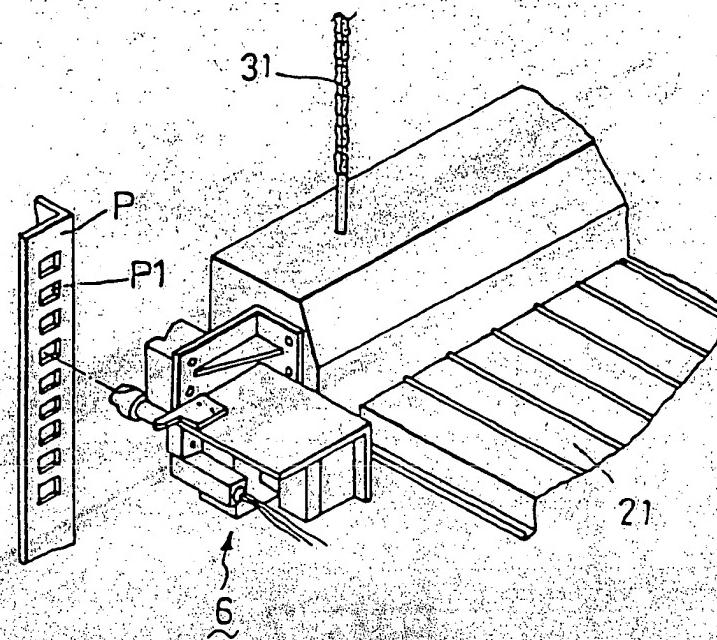


FIG. 5

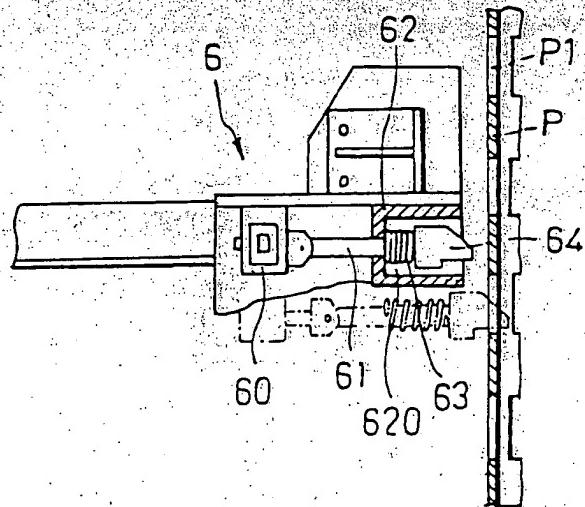


FIG. 6

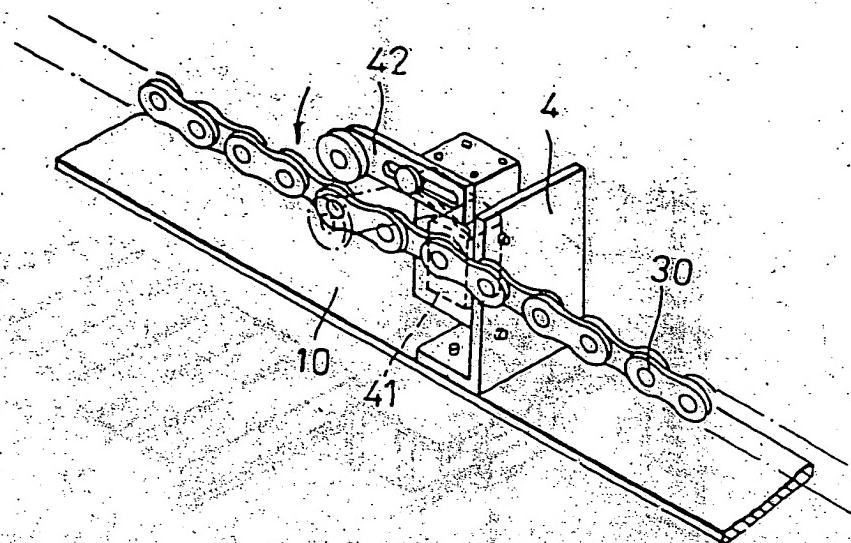


FIG. 7

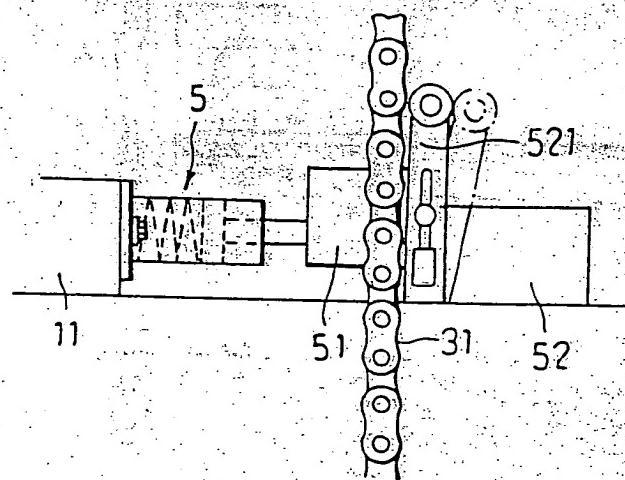


FIG. 8

LIFT ASSEMBLY FOR PARKING CARS

This invention relates to a lift assembly for parking cars, more particularly to a lift assembly which has a vertically movable parking platform, a hoisting chain unit and an anti-descent unit that can prevent the parking platform from downward movement if the hoisting chain unit breaks, so as to improve safety in use of the lift assembly.

Nowadays, because of the increasing number of cars, lift assemblies are used widely to park cars thereon. Such a lift assembly normally has a fixed parking platform, a movable parking platform disposed above the fixed parking platform, a hoisting chain unit for raising the movable parking platform, which may break due to overload or long-term usage, causing the movable parking platform to fall rapidly to the ground. As a precaution against this dangerous situation, an anti-descent unit is required to assure the safety of users.

Therefore, the main object of this invention is to provide a car parking lift assembly with an anti-descent unit which can prevent the movable parking platform of the lift assembly from undesired downward movement should the hoisting chain unit of the lift break accidentally.

The invention is defined in the claims. In a typical embodiment, a lift assembly for parking cars includes a frame unit having a front end portion and a rear end portion, a lower parking platform mounted securely on the frame unit so that one car can be parked thereon, an upper parking platform provided for parking of another car thereon, and a power operated hoisting chain unit interconnecting the upper parking platform and the frame unit so as to move the upper parking platform vertically on the frame unit. A support cable device includes two first cable units respectively connecting two opposite sides of the upper parking platform to the frame unit, in such a manner that each of the first cable units is fastened at one end to the upper end of the front end portion of the

frame unit and at the other end to the lower end of the rear end portion of the frame unit, so that the upper parking platform can move on the first cable units. An anti-descent unit includes an elongated upright positioning member fixed on the rear end portion of the frame unit and having a lengthwise row of positioning holes formed therein, a gripping rod mounted horizontally and movably on the upper parking platform in alignment with the positioning member, and a solenoid for controlling the movement of the gripping rod.

The gripping rod is normally spaced apart from the positioning member. A contact switch device is in touch with the chain unit and is connected electrically to the solenoid. The chain unit separates from the contact switch device when the chain unit is broken off. Separation of the chain unit from the contact switch device activates the solenoid so as to extend the gripping rod into one of the positioning holes of the positioning member, thereby preventing the upper parking platform from undesired downward movement.

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An embodiment of this invention will now be described by way of example with reference to the accompanying drawings, in which:

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Fig. 1 is a perspective view of a lift assembly for parking cars according to this invention;

Fig. 2 is a schematic side elevation view of the lift assembly shown in Fig. 1;

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Figs. 3 and 4 are schematic views illustrating the shapes of the paths along which the first and second cable units of the lift assembly extend;

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Fig. 5 is a perspective view showing the anti-descent unit of the lift assembly;

Fig. 6 is a schematic view illustrating the operation of the anti-descent unit of the lift assembly;

Fig. 7 is a perspective view showing the first contact switch device of the lift assembly, and

Fig. 8 is a schematic view illustrating the operation of the second contact switch device of the lift assembly.

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Referring to Figs. 1 and 2, the lift assembly shown therein is used to park cars (not shown) thereon and includes a frame unit (10), a lower parking platform (20) mounted securely on the lower end portion of the frame unit (10), an upper parking platform (21) mounted movably on the frame unit (10) and positioned over the lower parking platform (20), two power operated hoisting chain units respectively holding two 15 sides of the upper parking platform thereon, two normally closed first contact switch devices (4) respectively disposed on two sides of the frame unit (1), two normally closed second contact devices (5) respectively disposed on two sides of the frame unit (1), an anti-descent unit (6), and a support cable device.

The frame unit includes horizontal longitudinal beams (10), shorter transverse beams (11) and vertical corner posts (12). Each of the chain units consists of a horizontal section (30) and two vertical sections (31) which respectively extend downward from two ends of the horizontal section (30). The chain units are operated in a known manner by means of a motor (3) and an endless driving chain (32). The cable device consists of two N-shaped first cable units (71) disposed on two sides of the frame unit (1), and two N-shaped second cable units (72) disposed on two sides of the frame unit (1).

Figs 3 and 4 show the paths along which the first and second cable units (71, 72) extend. As illustrated, each of the first and second cable units (71, 72) extends around three pulleys (R) which are mounted on the upper parking platform (21) so that the upper parking platform (21) can move on the cable units (71, 72). Each of the first cable units (71) is fastened at one end to the upper end of the front end portion of the frame unit (1) and at the other end to the

lower end of the rear end portion of the frame unit (1). Each of the second cable units (72) is fastened at one end to the upper end of the rear end portion of the frame unit (1) and at the other end to the lower end of the front end portion of the frame unit (1). Accordingly, the first and second cable units (71, 72) can help the chain unit support the upper parking platform (21).

Referring to Figs. 5 and 6, the anti-descent unit (6) includes an elongated upright positioning member (P) fixed on the rear end portion of the frame unit (1) and having a lengthwise row of positioning holes (P1) formed therein, a solenoid (60) connected electrically to the first and second contact switch devices (4, 5), and a gripping rod (61) mounted horizontally and movably in the upper parking platform (21) in alignment with the positioning member (P). The gripping rod (61) extends through a casing (62) and has an enlarged gripping end (64) which is normally positioned within the accommodating space (620) of the casing (62). A compression spring (63) is sleeved on the gripping rod (61) between the enlarged gripping end (64) of the gripping rod (61) and a wall of the casing (62), in order to bias the enlarged gripping end (64) of the gripping rod (61), so that it extends from the casing (62). Because the contact switch devices (4, 5) are normally closed, the solenoid (60) attracts and contacts the inner end of the gripping rod (61) with the result that the compression spring (63) is compressed and that the enlarged gripping end (64) of the gripping rod (61) is in a retraction position where it is located within the casing (62). It is understood that when any of the first and second contact switch devices (4, 5) is changed from a closed position to an open position, the magnetic attraction force of the solenoid (60) is eliminated so that the compression spring (63) pushes outward the gripping rod (61) to separate from the solenoid (60), thus moving the enlarged gripping end (64) of the gripping rod (61) to an extended position (indicated by the phantom lines), where it extends from the casing (62) to press against the positioning member (P). At this time, as soon as the enlarged gripping end (64) of the gripping rod (61) registers with any of the positioning

holes (Pi) of the positioning member (P), the gripping rod (61) extends into the same.

Referring to Fig. 7, each of the first contact switch devices (4) is installed on one of the long horizontal beams (10) and includes a switch body (41) and a swing lever (42) which normally contacts the horizontal section (30) of the corresponding chain unit. Because the structure of the first contact switch devices (4) is known, the detailed description thereof will be omitted. If the chain unit should break at any position, the horizontal section (10) of the chain unit separates from the swing lever (42) of the first contact switch device (4) so as to extend the enlarged gripping end (64) of the gripping rod (61) into one of the positioning holes (Pi) of the gripping rod (61), thereby stopping rapid downward movement of the upper parking platform (21).

Referring to Fig. 8, each of the second contact switch devices (5) is installed on one of the transverse beams (11) and includes a spring-biased push rod (51) pressed against one of the vertical sections (31) of the corresponding chain unit, and a swing lever unit (52) which is similar to the first contact switch devices (4) in construction and which has a swing lever (521) that is normally located in a vertical position and that is normally spaced apart from the vertical section (31) of the chain unit at a small distance. If broken at any position accidentally, the chain unit separates from the second contact switch device (5) so that the spring-biased push rod (51) rotates the swing lever (521) to the position shown in the phantom lines, thereby activating the anti-descent unit and stopping downward movement of the upper parking platform (21). As soon as the chain unit breaks at any position, it separates from all of the contact switch devices (4, 5) due to the fact that the chain switch devices (4, 5) are all installed on the frame unit (1). As a result, although there are several contact switch devices (4, 5) in this embodiment, only one contact switch device is enough to achieve the object of this invention.

However, a decrease in the number of the contact switch devices reduces the efficiency of activating the anti-descent unit.

CLAIMS:

1. A lift assembly for parking cars, comprising:
  - a frame unit having a front end portion and a rear end portion;
  - 5 a lower parking platform mounted securely on the frame unit so that one of the cars can be parked thereon;
  - 10 an upper parking platform provided for parking of another of the cars thereon;
  - 15 a power operated hoisting chain unit interconnecting the upper parking platform and the frame unit so as to move the upper parking platform vertically on the frame unit;
  - 20 a support cable device including two first cable units respectively connecting two opposite sides of the upper parking platform to the frame unit, in such a manner that each of the first cable units is fastened at one end to the upper end of the front end portion of the frame unit and at the other end to the lower end of the rear end portion of the frame unit, so that the upper parking platform can move on the first cable units;
  - 25 an anti-descent unit including an elongated upright positioning member fixed on the rear end portion of the frame unit and having a lengthwise row of positioning holes formed therein, a gripping rod mounted horizontally and movably on the upper parking platform in alignment with the positioning member, and a solenoid controlling the movement of the gripping rod, the gripping rod being normally spaced apart from the positioning member; and
  - 30 a contact switch device being in touch with the chain unit and being connected electrically to the solenoid, the chain unit separating from the contact switch device when the chain unit is broken, separation of the chain unit from the contact switch device causing the gripping rod to be extended into one of the positioning holes of the positioning member, thereby preventing the upper parking platform from undesired downward movement.

2. A lift assembly as claimed in claim 1, wherein the

cable device further includes two second cable units respectively connecting two opposite sides of the upper parking platform to the frame unit, in such a manner that each of the second cable units is fastened at one end to the upper end of the rear end portion of the frame unit and at the other end to the lower end of the front end portion of the frame unit, so that the upper parking platform can move on the second cable units.

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3. A lift assembly substantially as described hereinbefore with reference to the accompanying drawings.

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21 FEBRUARY 1994**Relevant Technical Fields**

- (i) UK Cl (Ed.M) B8L (LB, LCD)  
 (ii) Int Cl (Ed.5) B66B 5/00, 5/02, 5/26 E04H 6/02, 6/06

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  
 (ii) ONLINE DATABASES: WPI

Documents considered relevant  
following a search in respect of  
Claims :-  
1-3

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Category	Identity of document and relevant passages	Relevant to claim(s)
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